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REGIONAL INPUT-OUTPUT MULTIPLIERS: CALCULATION, MEANING, USE AND MISUSE

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Introduction

John Maynard Keynes is supposed to have introduced the term *multiplier* into the jargon of economic science.[1] Keynes used the term to refer to the amplified effect of an initial economic stimulus after all of the secondary effects of the stimulus had worked their way through an economy. Later on in the same work[2], Keynes made an observation that now seems more than a little prophetic: "...practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist." Now, some 55 years later, most practical men (and women) seem to understand that every direct economic impact must have an amplified effect, so that the total impact will be some multiple of the direct impact. Indeed, there is perhaps no technical concept in economics that is so widely used (and misused) by non-economists as that of the multiplier.

The purpose of this article is fourfold: (1) to explain the concept of the multiplier as it is used in regional economic analysis, (2) to explain how multipliers are calculated using the input-output approach, (3) to point out some common misuses and misconceptions regarding the use of multipliers, and (4) to provide users with a set of income and employment multipliers for the Utah economy that is considerably more detailed than any previously available. Table 4 provides estimates of direct and total earnings coefficients as well as Type II income and employment multipliers for 411 industrial sectors of the Utah economy. The term *Type II* means that induced household consumption effects have been taken into account in the calculation of the multipliers, as well as direct and indirect interindustry effects.[3]

Multiplier Concept and Definitions

The term *regional impact multiplier* refers to the ratio of the size of the total effect on a regional economy of some initial direct exogenous impact to the size of the direct impact itself. There are a number of different kinds of multipliers that conform to this general definition. Three of these retain the traditional notion of an amplified effect, in the sense that the numerator and

the denominator of the ratio are of the same unit of measurement so that the ratio itself is dimensionless. These are the *output multiplier*, the *income multiplier*, and the *employment multiplier*.

The output multiplier refers to the ratio of the change in total output that is required from all sectors of a regional economy to the direct change in the basic output of a particular sector of the economy. The income multiplier refers to the ratio of the change in total income earned by workers in all sectors of the regional economy to the change in earnings of workers directly engaged in the production of the basic output. Lastly, the employment multiplier refers to the ratio of the change in total employment of workers in all sectors of the regional economy to the change in employment of workers directly engaged in the production of the basic output.

The term *basic* in the above definitions refers to any expansion in output that comes about as a consequence of the infusion of funds from a source outside the regional economy, including, e.g., funds obtained to finance new construction. The distinction between funds generated internally and funds generated externally is important, because in order for there to be a multiplier effect there must be outside funds flowing into the regional economy to pay for the augmented production. In general, if funds are merely diverted from one sector to another within the regional economy there will be no multiplier effect. The expansion in one sector will simply be offset by the contraction in the other sector. The term *export*, incidentally, is often used synonymously with *basic*, while the term *residentiary* (referring to ouput that is produced for the use of the residents of a region) is used antonymously.

Estimation Using Input-Output Analysis

Though there are different approaches to estimating regional economic impact multipliers, the input-output approach is generally preferred (provided sufficient resources for the task are available). This is the approach taken in the estimation of the income and employment multipliers shown in Table 4. The input-output model underlying these multipliers was developed by the Bureau of Economic Analysis of the U.S. Department of Commerce (BEA). This model is a member of the RIMS II class of economic models, whose characteristics and applicability are documented in several BEA publications.[4]

The basic analytical construct used in the input-output approach is the interindustry transactions table. Essentially this table shows how the total output of each producing sector within a regional economy is distributed among purchasing sectors, or conversely, what the total input of each purchasing sector consists of in terms of regional producing sector source. From information contained in the basic interindustry transactions table it is possible to construct two derivative input-output tables that are analytically more useful than the interindustry transactions table. These derivative tables characterize the interindustry structure of the regional economy by means of two types of input-output coefficients.

An input-output coefficient may be described as the dollar value of a particular input required from sources within the region to produce $1 worth of a particular output; for example, the earnings of labor required to produce $1 worth of electric power. Input-output coefficients may be expressed in terms of either (1) direct requirements or (2) total requirements. Direct requirements include only those requirements that are purchased directly by the industrial sector under consideration, while total requirements include not only direct requirements but also the requirements generated through the purchases of primary suppliers from secondary suppliers, and the requirements generated by the purchases of the secondary suppliers from tertiary suppliers, and so on. Total requirements also include requirements generated through purchases of consumer goods and services from the trade and services sectors of the regional economy by employees of the sector under consideration as well as by employees of all the supplying sectors.

The electric power example may be carried further to distinguish and illustrate these two concepts. According to Table 4 Utah power plants directly require (on average) about 10.6¢ in direct earnings of labor to produce $1 worth of electric power. But purchases by the electric utilities sector from other sectors, particularly including the coal mining sector, result in additional indirect labor requirements. Total requirements though, include not only the direct requirements and indirect requirements generated by purchasing inputs from

other industrial sectors, but also the induced requirements generated by household consumption expenditures out of the compensation received by labor participating in electric power production, both directly and indirectly. Thus, total earnings of labor involved in the production of $1 worth of Utah electricity amount to approximately 35.4¢ or about 3.3 times the direct requirement of 10.6¢. The ratio 3.3 is referred to as the income multiplier for the electric utilities sector.

The calculation of the direct requirements coefficients is quite simple. Each column entry in the interindustry transactions table is divided by the total output of the industry represented by the column. The result of this procedure is illustrated in Table 1. The total requirements coefficients are conceptually a bit more complicated. The direct requirements coefficients are first used to form a system of linear equations, each one equating the total output x_i of a given sector i to the output of the given sector required in production by other intermediate sectors plus the output of the given sector delivered to final demand y_i. Algebraically,

$$(1) \qquad x_i = a_{ij}x_j + y_i$$

where a_{ij} is the direct requirements coefficient representing the dollar value of input from sector i required to produce $1 worth of sector j output.

In matrix notation the entire system of equations can be expressed as

$$(2) \qquad \mathbf{x} = \mathbf{A}\mathbf{x} + \mathbf{y}$$

where **x** is a column vector of total outputs produced by each of the individual producing sectors, **y** is a column vector of outputs delivered to final demand by each of the individual producing sectors, and **A** is a square matrix of direct requirements coefficients a_{ij}, the first subscript locating the row position and the second subscript the column position of each coefficient within the matrix.

Given a vector of final demands **y**, the total output of each sector required to satisfy both intermediate and final demand requirements is given by the solution

$$(3) \qquad \mathbf{x} = (\mathbf{I} - \mathbf{A})^{-1}\mathbf{y}$$

where **I** is the identity matrix, and $(\mathbf{I} - \mathbf{A})^{-1}$ is the inverse of $(\mathbf{I} - \mathbf{A})$. The total requirements coefficients are simply the elements of $(\mathbf{I} - \mathbf{A})^{-1}$. The result of this calculation is illustrated in Table 2.

Income multipliers may then be derived by calculating the ratio of the total earnings requirement for each industrial sector in the $(\mathbf{I} - \mathbf{A})^{-1}$ matrix to the corresponding direct earnings requirement in the **A** matrix. Output multipliers may be derived by summing the coefficients in each column of $(\mathbf{I} - \mathbf{A})^{-1}$, excluding the household sector. The results of these calculations are illustrated in Table 3.

Employment multipliers may be calculated by transforming direct and total earnings requirements for each industrial sector into direct and total employment requirements through the use of industry-specific average wage rates as follows: Let e_i refer to direct earnings required per dollar of output of sector i as taken from the household row of **A**. Then define m_i as direct employment required per dollar of output in sector i, which is equal to e_i divided by w_i, where w_i is the average wage in sector i. Next, define a direct employment requirements vector **m** as a row vector consisting of the elements m_i. The vector of total employment requirements may then be derived as $\mathbf{m}(\mathbf{I} - \mathbf{A})^{-1}$. And employment multipliers may then be calculated by taking the ratio of each element in the total employment requirements vector $\mathbf{m}(\mathbf{I} - \mathbf{A})^{-1}$ to the corresponding element in the direct employment requirements vector **m**.

Multiplier Principles and Relationships

Certain general conclusions can be reached regarding the magnitudes of regional impact multipliers on the basis of a priori reasoning: first, generally speaking, multipliers will be larger in larger regions than smaller, because spending leakages tend to be larger in smaller regions. Thus, it is clearly inappropriate to apply a multiplier that has been estimated for a large regional economy for the purpose of estimating the impact of a project on a subregion of the larger region. Second, multipliers tend be larger for activity taking place near the center of a region than for activity near a region's borders, again because spending leakages will tend to be greater for activities near the boundaries of the region.

TABLE 1
HYPOTHETICAL DIRECT REQUIREMENTS FROM REGIONAL INDUSTRIES
PER DOLLAR OF REGIONAL INDUSTRY OUTPUT

Producing Sectors	Purchasing Sectors				
	Sector A	Sector B	Sector C	Sector D	Households
Sector A	.15	.03	.04	.10	.06
Sector B	.22	.05	.08	.07	.05
Sector C	.10	.04	.10	.04	.15
Sector D	.08	.02	.03	.20	.30
Households	.20	.30	.40	.25	.01

Note: Each element represents the input directly required from the region's row sector per dollar's worth of output produced by the region's column sector.

TABLE 2
HYPOTHETICAL TOTAL REQUIREMENTS (DIRECT, INDIRECT AND INDUCED)
FROM REGIONAL INDUSTRIES PER DOLLAR OF REGIONAL INDUSTRY OUTPUT
(Calculated from the Coefficients in Table 1)

Producing Sectors	Purchasing Sectors				
	Sector A	Sector B	Sector C	Sector D	Households
Sector A	1.29	.11	.15	.23	.18
Sector B	.38	1.13	.20	.21	.17
Sector C	.27	.15	1.27	.20	.28
Sector D	.36	.23	.33	1.50	.54
Households	.57	.48	.69	.57	1.35
Totals	2.87	2.10	2.64	2.71	2.52

Note: Each element represents the total input required (direct, indirect and induced) from the region's row sector per dollar's worth of output produced by the region's column sector.

TABLE 3
HYPOTHETICAL INCOME AND OUTPUT MULTIPLIERS
(Calculated from the Coefficients in Tables 1 and 2)

	Sector A	Sector B	Sector C	Sector D
Income Multiplier	2.85	1.60	1.73	2.28
Output Multiplier	2.31	1.62	1.94	2.14

Third, employment multipliers tend to be larger than income multipliers in low-wage sectors, and income multipliers tend to be larger than employment multipliers in high-wage sectors. The reason is simply that induced effects tend to be greater in high-wage sectors. This proposition makes it clear that it is inappropriate to use income multipliers for predicting employment effects, and vice versa.

When carefully estimated and properly applied, regional impact multipliers can be very useful tools of regional economic analysis. They, for example, have been used by the Bureau of Economic and Business Research to predict the impact of a decline in defense spending on the Utah economy, to estimate the impact of spending by out-of-state skiers on the Utah economy, to predict the economic impact of the proposed Superconducting Supercollider and to predict the economic impact of the Intermountain Power Project prior to its construction, to mention but a few.

Multiplier Misuses and Abuses

When casually estimated or misapplied, regional impact multipliers can not only be misleading, but their use for purposes of formulating public policy can be downright mischievous. Frequently, it seems that multipliers are used to justify projects on the basis of their public benefits that cannot be justified on the basis of their private benefits alone. It is quite possible that certain projects that are not viable without government subsidy are meritorious, but multiplier analysis is not the appropriate assessment tool in such situations. Income multipliers or employment multipliers can be used to estimate indirect and induced income and employment effects, respectively, but they cannot be used to predict the indirect and induced fiscal burdens of the project. What is indicated in such situations is cost-benefit analysis, which may incorporate the use of income and employment multipliers, but goes beyond the scope of simple income and employment multiplier analysis to come up with a bottom line net public benefit or net public burden for the project.

One of the most common multiplier abuses is to apply multipliers in situations where there is no change in export activity, or more generally, to situations in which there is no infusion of new external funding. The question is frequently raised, for example, as to the multiplier effect of establishing a new retail outlet of some sort in a region. The answer is that to the extent that spending of residents is merely diverted from old retail establishments to the new establishment, then there is no multiplier effect on the region as a whole. Of course, spending could be diverted from one locality to another within the region, in which case there would be two multiplier effects: a positive effect for the locality in which the new retail establishment is situated, but a negative effect on the locality or localities from which the spending is diverted. In neither case, though, would it be appropriate to use a multiplier for the whole region to estimate the effects in the different subregions.

Multipliers are frequently used to demonstrate the importance of a certain sector by some special interest group. For this purpose multipliers of apocryphal origin are popular. And for some reason the number 7 seems to be especially popular. The exercise would be completely legitimate, provided the correct multiplier were used, and provided it were applied only to basic industrial activity. Frequently, however, a dubiously large multiplier is applied to non-basic activity, resulting in a very exaggerated claim. It is interesting to observe that if all such claims were true, Utah would have perhaps a $300 billion economy in terms of gross state product, rather than the some $30 billion dollar economy that it actually has.

Output of the Trade Sectors

The Bureau of Economic Analysis treatment of the retail trade and wholesale trade sectors sometimes causes difficulties for novice multiplier users. The BEA (along with most other input-output modelers) defines the output of the trade sectors as the *trade margin*, by which is meant the difference between gross receipts and cost of goods sold. Consistent with this definition, the output of the other producing sectors is treated as if it were delivered directly from the producer to the consumer, bypassing the trade sectors. Trade is thus treated as only a conduit, just the same as transportation.

This results in the calculation of total requirements coefficients and impact multipliers that properly reflects the actual production requirements

of the different producing sectors vis-a-vis each other, and avoids the aggregation error that would result from commingling the outputs of different producers that flow through the trade sectors. However, since output of the trade sector is defined as the trade margin and not gross sales, it is improper to use gross sales in multiplier calculations where the trade sectors are concerned.

For example, suppose that tourists are persuaded to spend an additional $100 million per year in the Utah retail trade sector. It might be tempting to take the retail trade sector direct earnings coefficient from Table 4 (.4968) and estimate direct earnings from the expanded tourist spending to be equal to $49.68 million and then to multiply that number by the Type II income multiplier (1.5659) to come up with an estimated personal income expansion of about $78 million per year.

This approach, however, is erroneous. A correct approach would require that only the trade and transportation margins involved in the additional $100 million of spending be used in the calculation of the economic impact.[5] A recent BEBR study on the impact of out-of-state skier spending on the Utah economy estimated that for the average spending pattern of visiting skiers the retail trade margin was about 30 percent, the associated average wholesale trade margin was about 10 percent, and the associated transportation margin was about 1 percent.[6]

Applying these numbers to the assumed $100 million expansion in tourist spending results in an expanded retail trade output of $30 million, an expanded wholesale trade output of $10 million and an expanded transportation output of $1 million. The direct earnings coefficients for these sectors from Table 4 are .4968, .3912, and .4608 (for motor freight transportation). Applying these coefficients to the expanded output estimates results in direct earnings estimates of $14.90 million for retail trade, $3.91 million for wholesale trade and $0.46 million for transportation, for a total direct earnings estimate of $19.27 million.

Again reading from Table 4, the income multipliers for retail trade, wholesale trade and transportation (motor freight) are 1.4719, 2.1738, and 2.2495, respectively. Applying these multipliers to the direct earnings estimates results in total earnings estimates of $21.93 million for retail trade, $8.50 million for wholesale trade and $1.03 million for transportation, for a total of about $31 million in personal income expansion, which is a far cry from the $78 million that was obtained using the naive multiplier approach outlined above.

Use of Multiplier Analysis in Small Areas

Extreme care should be exercised in using multipliers derived from input-output models for small geographical areas. The use of such multipliers for impact prediction purposes implicitly assumes that the trading patterns in existence at the time of the construction of the input-output model will be unaffected by the location of new industry in the area. This implies, inter alia, that the percent of industrial requirements imported will remain the same for every industry after the establishment of new industrial activity in the area.

At best, this assumption is not very satisfactory and, at worst, could lead to quite erroneous results, since the new activity itself could completely alter existing trading patterns in the area. As a general proposition, whenever a new industrial project will constitute a significant proportion of the economic base of a region, the use of multipliers derived from an existing input-output model to predict the impact of the new project is probably ill advised. What is required in such situations is a detailed industrial breakdown of the inputs that the new project will obtain from local sources.

Other Pitfalls in Using Multipliers

Implicit in the use of input-output derived multipliers for impact prediction purposes is the assumption that the technical coefficients defining the direct requirements matrix remain constant over the prediction period. But these coefficients can (and do) change for several different reasons: (1) new technology may be introduced resulting in a different relative mix of physical inputs, (2) relative factor prices may change, resulting in different dollar values of the input mix, or (3) trading patterns among regions may change, resulting in a different mix of imported inputs compared to inputs produced within the region. A significant occurrence of any of these possibilities may be enough to invalidate use of the input-output derived multipliers for prediction purposes.

The Utah primary copper sector is a good case in point. According to Table 4, the direct earnings requirement for producing a dollar's worth of refined copper is about 7¢ and the total earnings requirement is about 46¢. These numbers suggest that a $1 expansion in refined copper production would result in a direct earnings increase of 7¢ for copper refinery workers and a total earnings increase of 46¢ for all Utah workers (including, of course, copper miners). The employment multiplier of approximately 11 suggests that for every additional worker required in the production of refined copper a total of about 11 workers would be required to satisfy total output requirements from all sectors (including workers required in the copper mining sector).

However, it should be noted that these coefficients were derived on the basis of 1986 Utah average wage rates and 1977 national average technical coefficients. Recent technological innovations and changes in wage rates for copper workers, no doubt render these coefficients (and the multipliers upon which they are based) invalid. This means that any impact predictions based on them would be quite suspect. Incidentally, the high employment multiplier relative to the income multiplier for the refined copper sector can be explained largely by the relatively high wage rates that formerly prevailed in the Utah refined copper sector.

Another fairly common error in multiplier analysis involves the use of an employment multiplier as defined by the Bureau of Economic Analysis. The BEA defines the employment multiplier for sector i as the total number of jobs generated per million dollars of output delivered to final demand from sector i. Note that the employment multiplier under this definition is not a dimensionless number, and note particularly that the value of this multiplier is dependent upon the general level of wages and prices in the economy. This means that the published value for this type employment multiplier is valid only for the base year used in its calculation.

If the general level of prices has increased significantly since the base year, the use of the published value for the multiplier (without adjustment for price changes) will result in a significant overestimation of employment effects. For example, if the general level of prices has increased by 25 percent since the base year, then use of a BEA employment multiplier calculated as of the base year will result in employment effects being overstated by approximately 25 percent, also. Of course, this type of error is easily rectified by means of an appropriate price index adjustment, but this type of adjustment seldom seems to occur.

Finally, the output effects of a proposed project are frequently calculated by means of an output multiplier and then represented to be the benefit to a regional economy of the proposed project. However, the increase in the gross ouput of a regional economy is no more of a benefit than the increase in gross sales to a business firm. Neither gross output nor gross sales is a bottom line figure. Both completely ignore the costs of achieving the result, which may more than offset the benefits associated with the increased output or increased sales. Apparently the only reason for using the projected change in gross output is that this results in a much more impressive number, a number that could be a magnitude or several magnitudes of order greater than the change in regional personal income.

Notes

1. See Phyllis Deane and Jessica Kuper, *A Lexicon of Economics* (Routledge, 1988), pp. 275-278.

2. In John Maynard Keynes, *The General Theory of Employment Interest and Money*, (Harcourt, Brace and Company, 1936) p. 383.

3. The Roman numeral *II* in *Type II multiplier* apparently originated in an article by Werner Hirsch entitled "Interindustry Relations of a Metropolitan Area" that appeared in *The Review of Economic Statistics*, Vol. 41, No. 2 (November 1959), though Hirsch used the term *Model II* rather than *Type II*. The term *Model II* had evolved into *Type II* by the time William Miernyck had written *Elements of Input-Output Economics* (Random House, 1965).

4. See *Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System (RIMS II)* (U.S. Department of Commerce, Bureau of Economic Analysis, May 1986) and *Regional Input-Output*

(continued on page 17)

TABLE 1
UTAH EARNINGS REQUIREMENTS COEFFICIENTS AND TYPE II MULTIPLIERS
AS CALCULATED FROM BEA RIMS II MODEL COEFFICIENTS

Input-Output Sector	Direct Earnings Coefficient	Total Earnings Coefficient	Type II Income Multiplier	Type II Employment Multiplier
AGRICULTURE, FORESTRY, AND FISHERIES				
Dairy Farm Products	0.1743	0.3653	2.0958	1.5045
Poultry and Eggs	0.0892	0.2981	3.3424	2.0194
Meat Animals	0.0860	0.3199	3.7208	2.4080
Miscellaneous Livestock	0.1284	0.3277	2.5518	1.7312
Food Grains	0.2562	0.5059	1.9748	1.5135
Feed Grains	0.2439	0.4872	1.9974	1.4951
Grass Seeds	0.3221	0.5870	1.8224	1.4416
Fruits	0.4038	0.6773	1.6773	1.3514
Tree Nuts	0.4681	0.7321	1.5638	1.3030
Vegetables	0.4595	0.7145	1.5548	1.2921
Sugar Crops	0.3816	0.6249	1.6377	1.3376
Miscellaneous Crops	0.3191	0.5690	1.7833	1.3673
Forest Products	0.5192	0.7589	1.4617	1.2535
Greenhouse and Nursery Products	0.4229	0.7168	1.6950	1.3480
Commercial Fishing	0.4302	0.6450	1.4992	1.3323
Agricultural, Forestry, and Fishery Services	0.3367	0.6417	1.9058	1.4629
Landscape and Horticultural Services	0.5726	0.9052	1.5809	1.3081
MINING				
Iron and Ferroalloy Ores Mining	0.2177	0.4445	2.0419	3.1648
Copper Ore Mining	0.2971	0.6003	2.0204	3.0667
Nonferrous Metal Mining, Except Copper	0.2543	0.4908	1.9303	2.9850
Coal Mining	0.3047	0.5805	1.9052	3.3500
Crude Petroleum and Natural Gas	0.1013	0.2364	2.3331	3.6386
Stone Mining and Quarrying	0.2925	0.5267	1.8004	2.7867
Sand and Gravel Mining	0.3000	0.5558	1.8528	2.8639
Clay, Ceramic, and Refractory Minerals Mining	0.2562	0.4972	1.9408	3.0555
Nonmetallic Mineral Services and Misc. Mining	0.2753	0.5103	1.8533	2.9016
Chemical and Fertilizer Mineral Mining	0.2003	0.4331	2.1622	3.4483
CONSTRUCTION				
New Residential 1-Unit Structures, Nonfarm	0.3185	0.6841	2.1479	2.6552
New Residential 2-4 Unit Structures, Nonfarm	0.3363	0.7109	2.1139	2.6128
New Residential Garden Apartments	0.3304	0.7040	2.1308	2.6224
New Residential High-Rise Apartments	0.2706	0.6445	2.3817	2.9358
New Residential Alterations, Nonfarm	0.2621	0.6484	2.4739	3.1341
New Hotels and Motels	0.3228	0.7069	2.1899	2.6614
New Dormitories and Other Group Housing	0.3494	0.7378	2.1116	2.5490
New Industrial Buildings	0.3975	0.7780	1.9572	2.3409
New Office Buildings	0.3563	0.7335	2.0587	2.4881
New Warehouses	0.3893	0.7615	1.9561	2.3497
New Garages and Service Stations	0.3758	0.7557	2.0109	2.4286
New Stores and Restaurants	0.3493	0.7313	2.0936	2.5299
New Religious Buildings	0.3876	0.7845	2.0240	2.4551

TABLE 4 (continued)

Input-Output Sector	Direct Earnings Coefficient	Total Earnings Coefficient	Type II Income Multiplier	Type II Employment Multiplier
New Educational Buildings	0.3749	0.7652	2.0411	2.4707
New Hospitals	0.3654	0.7461	2.0419	2.4643
New Residential Institutions	0.3868	0.7621	1.9703	2.3997
New Amusement and Recreation Buildings	0.3634	0.7629	2.0993	2.5578
Other New Nonfarm Buildings	0.3729	0.7604	2.0392	2.4859
New Telephone and Telegraph Facilities	0.4416	0.7489	1.6959	2.0200
New Railroads	0.4323	0.8002	1.8510	2.1668
New Electric Utility Facilities	0.4157	0.8299	1.9964	2.4090
New Gas Utility Facilities	0.3723	0.8403	2.2571	2.7689
New Petroleum Pipelines	0.3756	0.8396	2.2354	2.7250
New Water Supply Facilities	0.3476	0.8226	2.3665	2.8367
New Sewer System Facilities	0.3570	0.8280	2.3193	2.8089
New Local Transit Facilities	0.3267	0.7706	2.3587	2.8707
New Highways and Streets	0.3193	0.7544	2.3627	2.8795
New Farm Housing Units and Alterations	0.2711	0.6647	2.4519	3.1004
New Farm Service Facilities	0.3965	0.7540	1.9016	2.3020
New Oil and Gas Well Drilling	0.3342	0.7436	2.2250	2.5878
New Oil, Gas, and Mineral Exploration	0.6018	0.8945	1.4864	1.7381
New Access Structures for Mineral Development	0.4387	0.7512	1.7123	1.9928
New Military Facilities	0.4459	0.8269	1.8545	2.2174
New Dams and Reservoirs	0.4075	0.8692	2.1330	2.6470
Other New Conservation and Development Facilities	0.3882	0.8648	2.2277	2.7780
Other New Nonbuilding Facilities	0.3501	0.7755	2.2151	2.7259
Residential Maintenance and Repair	0.3673	0.7042	1.9175	2.3392
Other Nonfarm Buildings Maintenance and Repair	0.4719	0.8105	1.7176	2.0497
Farm Residence Maintenance and Repair	0.3533	0.6831	1.9332	2.3268
Farm Service Facility Maintenance and Repair	0.3334	0.6825	2.0469	2.4327
Telephone and Telegraph Maintenance and Repair	0.7532	1.0906	1.4479	1.7256
Railroad Maintenance and Repair	0.5614	0.8990	1.6013	1.8573
Electric Utility Maintenance and Repair	0.5061	0.8768	1.7323	2.1708
Gas Utility Maintenance and Repair	0.3826	0.7742	2.0234	2.3221
Petroleum Pipeline Maintenance and Repair	0.4026	0.7960	1.9772	2.2786
Water Supply Maintenance and Repair	0.4933	0.8729	1.7696	2.0400
Sewer Maintenance and Repair	0.6281	0.9992	1.5908	1.8482
Local Transit Maintenance and Repair	0.3666	0.7132	1.9452	2.2807
Military Facility Maintenance and Repair	0.3864	0.7444	1.9264	2.2392
Conservation and Development Maint. and Repair	0.3726	0.7649	2.0531	2.3708
Highway and Street Maintenance and Repair	0.5656	0.9280	1.6406	1.9001
Oil and Gas Well Maintenance and Repair	0.4565	0.7194	1.5759	1.8326
Other Nonbuilding Facility Maintenance and Repair	0.4020	0.7596	1.8895	2.1991
MANUFACTURING				
Guided Missiles and Space Vehicles	0.3509	0.6021	1.7160	2.6325
Small Arms	0.3773	0.6664	1.7662	2.1701
Small Arms Ammunition	0.3446	0.6074	1.7628	2.1687
Other Ordnance and Accessories	0.5602	0.8762	1.5640	1.9111
Meat Packing Plants	0.0862	0.4127	4.7858	2.6482

TABLE 4 (continued)

Input-Output Sector	Direct Earnings Coefficient	Total Earnings Coefficient	Type II Income Multiplier	Type II Employment Multiplier
Sausages and Other Prepared Meats	0.1157	0.4866	4.2055	5.3482
Poultry Dressing Plants	0.1114	0.3678	3.3018	4.4325
Poultry and Egg Processing	0.1104	0.3839	3.4759	4.3639
Cheese, Natural and Processed	0.0669	0.4250	6.3571	9.4215
Condensed and Evaporated Milk	0.0836	0.3326	3.9771	5.9681
Ice Cream and Frozen Desserts	0.1730	0.4586	2.6513	3.2550
Fluid Milk	0.1141	0.4139	3.6268	5.4337
Canned Specialties	0.1242	0.3313	2.6664	3.1811
Canned Fruits and Vegetables	0.1593	0.3941	2.4745	3.0196
Dehydrated Food Products	0.1530	0.4157	2.7178	3.2878
Pickles, Sauces, and Salad Dressings	0.1022	0.2847	2.7845	3.2172
Fresh or Frozen Packaged Fish	0.1189	0.3429	2.8831	3.2934
Frozen Specialties	0.1595	0.4200	2.6328	3.0340
Flour and Other Grain Mill Products	0.0864	0.3930	4.5500	6.6503
Prepared Feeds, n.e.c.	0.0620	0.2532	4.0866	4.6902
Bread, Cake, and Related Products	0.3002	0.6093	2.0298	2.3273
Cookies and Crackers	0.2372	0.4747	2.0016	2.2687
Sugar	0.1162	0.4042	3.4781	4.4023
Confectionery Products	0.1587	0.4019	2.5320	2.9026
Bottled and Canned Soft Drinks	0.2008	0.3949	1.9666	2.2022
Flavoring Extracts and Sirups, n.e.c.	0.1367	0.3116	2.2786	2.5488
Animal and Marine Fats and Oils	0.1181	0.3313	2.8048	3.2221
Manufactured Ice	0.3825	0.7003	1.8308	2.0354
Macaroni and Spaghetti	0.1545	0.4466	2.8899	3.4164
Food Preparations, n.e.c.	0.1451	0.3650	2.5160	2.8897
Broadwoven Fabric Mills and Fabric Finishing	0.1961	0.3547	1.8085	1.4933
Floor Coverings	0.1348	0.2607	1.9344	1.5468
Felt Goods, n.e.c.	0.3028	0.5229	1.7266	1.4533
Knit Outerwear Mills	0.2902	0.4614	1.5899	1.3913
Apparel Made from Purchased Materials	0.2888	0.4938	1.7099	1.5355
Curtains and Draperies	0.2656	0.4698	1.7689	1.5643
Housefurnishings, n.e.c.	0.1855	0.3458	1.8641	1.5959
Textile Bags	0.2501	0.4134	1.6526	1.4640
Canvas and Related Products	0.2893	0.4689	1.6209	1.4605
Automotive and Apparel Trimmings	0.2858	0.4589	1.6058	1.4400
Fabricated Textile Products, n.e.c.	0.2605	0.4249	1.6309	1.4641
Logging Camps and Logging Contractors	0.1784	0.2981	1.6710	1.7173
Sawmills and Planing Mills, General	0.2332	0.4005	1.7175	1.7284
Special Product Sawmills, n.e.c.	0.2964	0.5085	1.7153	1.7337
Millwork	0.2249	0.4547	2.0220	1.9955
Wood Kitchen Cabinets	0.3457	0.5757	1.6652	1.6831
Veneer and Plywood	0.2086	0.3774	1.8088	1.7949
Structural Wood Members, n.e.c.	0.2188	0.4559	2.0838	2.0516
Prefabricated Wood Buildings	0.2138	0.4675	2.1862	2.1307
Wood Preserving	0.1649	0.3831	2.3234	2.2346
Wood Pallets and Skids	0.2697	0.5183	1.9215	1.9207
Wood Products, n.e.c.	0.2828	0.5069	1.7925	1.7945

TABLE 4 (continued)

Input-Output Sector	Direct Earnings Coefficient	Total Earnings Coefficient	Type II Income Multiplier	Type II Employment Multiplier
Wood Containers	0.2915	0.5504	1.8880	1.8981
Wood Household Furniture	0.3195	0.5759	1.8023	1.8122
Household Furniture, n.e.c.	0.2957	0.5313	1.7965	1.7889
Wood TV and Radio Cabinets	0.3334	0.6057	1.8167	1.8310
Upholstered Household Furniture	0.2919	0.5148	1.7633	1.7783
Metal Household Furniture	0.2557	0.5382	2.1045	2.0346
Mattresses and Bedsprings	0.2217	0.4683	2.1119	2.1075
Wood Office Furniture	0.2981	0.5580	1.8716	1.8831
Public Building Furniture	0.3109	0.6119	1.9680	1.9395
Wood Partitions and Fixtures	0.3388	0.6159	1.8177	1.8270
Metal Partitions and Fixtures	0.2839	0.6035	2.1261	1.9990
Drapery Hardware and Blinds and Shades	0.2544	0.4872	1.9151	1.8723
Furniture and Fixtures, n.e.c.	0.3127	0.5555	1.7766	1.7503
Envelopes	0.3240	0.5282	1.6305	2.0762
Sanitary Paper Products	0.1347	0.2885	2.1411	2.8022
Building Paper and Board Mills	0.2666	0.5514	2.0686	2.6455
Bags, Except Textile	0.2000	0.3865	1.9323	2.5146
Die-Cut Paper and Board	0.1969	0.3409	1.7309	2.2107
Stationery Products	0.2573	0.4512	1.7536	2.2636
Paperboard Containers and Boxes	0.2122	0.3719	1.7525	2.2214
Newspapers	0.3675	0.6592	1.7936	1.9009
Periodicals	0.2267	0.5693	2.5117	2.7518
Book Publishing	0.2410	0.5537	2.2974	2.4325
Book Printing	0.3775	0.6277	1.6630	1.7361
Miscellaneous Publishing	0.3701	0.6331	1.7104	1.8086
Commercial Printing	0.3252	0.5526	1.6994	1.7797
Lithographic Platemaking and Services	0.4493	0.7194	1.6011	1.6807
Manifold Business Forms	0.2341	0.4244	1.8128	1.8913
Blankbooks and Looseleaf Binders	0.3515	0.5854	1.6655	1.7487
Greeting Card Publishing	0.2651	0.5098	1.9233	2.0091
Engraving and Plate Printing	0.4292	0.6735	1.5693	1.6630
Bookbinding and Related Work	0.4953	0.7691	1.5527	1.6573
Typesetting	0.5238	0.7706	1.4710	1.5667
Photoengraving	0.4414	0.7490	1.6967	1.7996
Industrial Inorganic and Organic Chemicals	0.1500	0.4074	2.7156	4.2911
Nitrogenous and Phosphatic Fertilizers	0.0879	0.3363	3.8249	6.1065
Fertilizers, Mixing Only	0.0891	0.3798	4.2628	7.1590
Agricultural Chemicals, n.e.c.	0.1080	0.3384	3.1326	5.2040
Adhesives and Sealants	0.1328	0.3555	2.6779	4.2499
Explosives	0.2789	0.5706	2.0460	3.1186
Printing Ink	0.1523	0.3794	2.4910	3.8476
Chemical Preparations, n.e.c.	0.1302	0.4059	3.1171	5.0464
Plastics Materials and Resins	0.1550	0.4116	2.6551	4.1886
Synthetic Rubber	0.1471	0.3862	2.6247	3.9970
Cellulosic Man-Made Fibers	0.2055	0.4803	2.3369	3.5248
Drugs	0.2151	0.4799	2.2315	3.7395

TABLE 4 (continued)

Input-Output Sector	Direct Earnings Coefficient	Total Earnings Coefficient	Type II Income Multiplier	Type II Employment Multiplier
Soap and Other Detergents	0.1152	0.3602	3.1270	5.2148
Polishes and Sanitation Goods	0.1098	0.3385	3.0821	5.3767
Surface Active Agents	0.2103	0.4840	2.3013	3.5331
Toilet Preparations	0.1238	0.3585	2.8968	5.0463
Paints and Allied Products	0.1479	0.3832	2.5914	4.1206
Petroleum Refining	0.0359	0.1787	4.9763	8.4444
Products of Petroleum and Coal, n.e.c.	0.0420	0.2074	4.9364	8.2405
Paving Mixtures and Blocks	0.0949	0.3863	4.0725	6.4840
Asphalt Felts and Coatings	0.1031	0.3831	3.7164	6.0057
Tires and Inner Tubes	0.2352	0.4462	1.8968	2.1325
Fabricated Rubber Products, n.e.c.	0.3237	0.5918	1.8284	2.0509
Miscellaneous Plastics Products	0.2275	0.4226	1.8576	2.0922
Rubber and Plastics Hose and Belting	0.3304	0.5611	1.6984	1.9141
Leather Tanning and Finishing	0.2117	0.5160	2.4372	3.0370
Shoes, Except Rubber	0.3227	0.5438	1.6850	1.9278
Luggage	0.2880	0.5283	1.8343	2.1330
Women's Handbags and Purses	0.3007	0.4991	1.6598	1.9175
Personal Leather Goods	0.2741	0.4996	1.8228	2.1368
Leather Goods, n.e.c.	0.2510	0.4642	1.8492	2.1285
Glass and Glass Products, Except Containers	0.3381	0.6116	1.8091	2.2779
Cement, Hydraulic	0.1924	0.5060	2.6296	3.2764
Brick and Structural Clay Tile	0.2961	0.5466	1.8457	2.3056
Ceramic Wall and Floor Tile	0.3934	0.6881	1.7493	2.1857
Clay Refractories	0.2967	0.6552	2.2085	2.7449
Structural Clay Products, n.e.c.	0.3466	0.6688	1.9296	2.4161
Pottery Products, n.e.c.	0.4100	0.7567	1.8457	2.3240
Concrete Block and Brick	0.2555	0.6704	2.6241	3.3010
Concrete Products, n.e.c.	0.3040	0.6609	2.1743	2.7360
Ready-Mixed Concrete	0.2102	0.6335	3.0141	3.7849
Lime	0.1929	0.5485	2.8436	3.4655
Gypsum Products	0.1734	0.4440	2.5608	3.1955
Cutstone and Stone Products	0.3507	0.6565	1.8721	2.3481
Abrasive Products	0.2351	0.4436	1.8867	2.4053
Asbestos Products	0.2330	0.5307	2.2772	2.8635
Gaskets, Packing and Sealing Devices	0.3369	0.5964	1.7700	2.2272
Minerals, Ground or Treated	0.1871	0.5445	2.9096	3.6979
Mineral Wool	0.2016	0.4107	2.0376	2.5585
Nonmetallic Mineral Products, n.e.c.	0.2472	0.5326	2.1543	2.7544
Blast Furnaces and Steel Mills	0.2451	0.5790	2.3619	3.8929
Cold Finishing of Steel Shapes	0.1621	0.5087	3.1375	5.3426
Steel Pipe and Tubes	0.1974	0.5419	2.7449	4.5877
Iron and Steel Foundries	0.3304	0.6300	1.9069	3.1362
Metal Heat Treating	0.3043	0.5612	1.8445	3.0144
Primary Metal Products, n.e.c.	0.1624	0.3627	2.2335	3.8132
Primary Copper	0.0713	0.4587	6.4363	11.0427
Primary Nonferrous Metals, n.e.c.	0.1643	0.4543	2.7657	4.6380
Secondary Nonferrous Metals	0.0910	0.3771	4.1446	7.7693

TABLE 4 (continued)

Input-Output Sector	Direct Earnings Coefficient	Total Earnings Coefficient	Type II Income Multiplier	Type II Employment Multiplier
Copper Rolling and Drawing	0.1181	0.4341	3.6759	6.3811
Nonferrous Rolling and Drawing, n.e.c.	0.1167	0.3386	2.9014	5.0499
Nonferrous Wire Drawing and Insulating	0.1470	0.3384	2.3020	3.9081
Aluminum Castings	0.2973	0.5100	1.7155	2.8662
Brass, Bronze, and Copper Castings	0.2436	0.5711	2.3442	3.9577
Metal Cans	0.1775	0.4466	2.5155	2.9543
Metal Sanitary Ware	0.2835	0.5915	2.0868	2.5421
Plumbing Fixture Fittings and Trim	0.2238	0.4473	1.9983	2.4341
Heating Equipment, Except Electric	0.2559	0.5415	2.1162	2.5605
Fabricated Structural Metal	0.2594	0.5953	2.2949	2.7193
Metal Doors, Sash, and Trim	0.2304	0.4381	1.9015	2.3268
Fabricated Plate Work (Boiler Shops)	0.2794	0.6054	2.1665	2.6027
Sheet Metal Work	0.2330	0.5184	2.2250	2.6650
Architectural Metal Work	0.3004	0.5963	1.9852	2.3790
Prefabricated Metal Buildings	0.1879	0.5230	2.7840	3.2519
Miscellaneous Metal Work	0.1905	0.5615	2.9474	3.4027
Screw Machine Products and Bolts, Nuts, and Rivets	0.3046	0.6286	2.0635	2.4624
Metal Stampings, n.e.c.	0.2869	0.5688	1.9826	2.3765
Hand and Edge Tools, n.e.c.	0.3055	0.5698	1.8650	2.2522
Hardware, n.e.c.	0.3065	0.5623	1.8344	2.2133
Plating and Polishing	0.3543	0.6286	1.7744	2.1639
Metal Coating and Allied Services	0.2496	0.5355	2.1458	2.5567
Miscellaneous Fabricated Wire Products	0.2857	0.5866	2.0529	2.4406
Steel Springs, Except Wire	0.2619	0.5973	2.2810	2.6511
Pipe, Valves, and Pipe Fittings	0.2434	0.5334	2.1911	2.6362
Fabricated Metal Products, n.e.c.	0.2658	0.5275	1.9843	2.3911
Turbines and Turbine Generator Sets	0.2941	0.5788	1.9680	2.6120
Internal Combustion Engines, n.e.c.	0.2345	0.4723	2.0138	2.6880
Farm Machinery and Equipment	0.2518	0.4993	1.9830	2.6340
Construction Machinery and Equipment	0.2641	0.5383	2.0386	2.7105
Mining Machinery, Except Oil Field	0.2531	0.5366	2.1203	2.8293
Oil Field Machinery	0.2614	0.5401	2.0663	2.7748
Conveyors and Conveying Equipment	0.2866	0.5619	1.9608	2.6295
Hoists, Cranes, and Monorails	0.2859	0.5383	1.8826	2.5100
Industrial Trucks and Tractors	0.2640	0.5655	2.1421	2.8786
Machine Tools, Metal Cutting Types	0.3648	0.6372	1.7468	2.3381
Machine Tools, Metal Forming Types	0.3482	0.6279	1.8032	2.3920
Special Dies, Tools and Accessories	0.4166	0.6842	1.6422	2.1736
Power Driven Hand Tools	0.2385	0.4471	1.8747	2.5491
Metalworking Machinery, n.e.c.	0.3180	0.5569	1.7511	2.3390
Food Products Machinery	0.3287	0.6114	1.8602	2.4944
Textile Machinery	0.3713	0.7049	1.8982	2.5830
Woodworking Machinery	0.2516	0.5122	2.0360	2.7564
Printing Trades Machinery	0.3144	0.5798	1.8441	2.4920
Special Industry Machinery, n.e.c.	0.3283	0.6123	1.8652	2.4980
Pumps and Compressors	0.2655	0.5409	2.0373	2.7743
Blowers and Fans	0.2819	0.5448	1.9329	2.6097

TABLE 4 (continued)

Input-Output Sector	Direct Earnings Coefficient	Total Earnings Coefficient	Type II Income Multiplier	Type II Employment Multiplier
Industrial Patterns	0.4927	0.7772	1.5773	2.0989
Power Transmission Equipment	0.3390	0.6132	1.8087	2.3980
Industrial Furnaces and Ovens	0.3074	0.5806	1.8887	2.5496
General Industrial Machinery, n.e.c.	0.3131	0.5876	1.8764	2.5539
Machinery, Except Electrical, n.e.c.	0.4075	0.7368	1.8081	2.4485
Electronic Computing Equipment	0.2761	0.6613	2.3948	3.3717
Scales and Balances	0.3063	0.6011	1.9623	2.7285
Commercial Laundry Equipment	0.2789	0.5864	2.1024	2.8741
Refrigeration and Heating Equipment	0.2303	0.4617	2.0051	2.7281
Service Industry Machines, n.e.c.	0.2654	0.5555	2.0930	2.8602
Instruments to Measure Electricity	0.3648	0.6278	1.7209	2.0681
Transformers	0.3035	0.5917	1.9496	2.3212
Switchgear and Switchboard Apparatus	0.3343	0.5845	1.7484	2.1086
Motors and Generators	0.3335	0.6060	1.8169	2.1648
Industrial Controls	0.3550	0.6181	1.7411	2.0996
Electric Housewares and Fans	0.2169	0.4369	2.0147	2.4451
Household Appliances, n.e.c.	0.1928	0.4411	2.2881	2.6988
Lighting Fixtures and Equipment	0.2491	0.5035	2.0214	2.4435
Wiring Devices	0.2829	0.5621	1.9871	2.3766
Radio and TV Receiving Sets	0.2491	0.5704	2.2895	2.8819
Phonograph Records and Tapes	0.2827	0.5902	2.0877	2.6341
Telephone and Telegraph Apparatus	0.3201	0.6263	1.9564	2.3975
Radio and TV Communication Equipment	0.4336	0.7935	1.8300	2.2205
Electron Tubes	0.3710	0.7013	1.8903	2.2948
Semiconductors and Related Devices	0.3644	0.7013	1.9246	2.3463
Other Electronic Components	0.3284	0.6623	2.0165	2.4595
Storage Batteries	0.2245	0.4270	1.9021	2.2976
X-Ray Apparatus and Tubes	0.3454	0.6437	1.8635	2.2717
Engine Electrical Equipment	0.3406	0.5936	1.7430	2.0829
Electrical Equipment and Supplies, n.e.c.	0.3252	0.6294	1.9354	2.3493
Truck and Bus Bodies	0.2439	0.4707	1.9301	2.4166
Truck Trailers	0.1831	0.3930	2.1460	2.6551
Motor Vehicles and Car Bodies	0.1165	0.2505	2.1509	2.7732
Motor Vehicles Parts and Accessories	0.2652	0.5403	2.0373	2.4830
Aircraft and Missile Engines and Engine Parts	0.3552	0.6923	1.9491	3.0810
Aircraft and Missile Equipment, n.e.c.	0.4087	0.7414	1.8142	2.8391
Boat Building and Repairing	0.3665	0.6095	1.6632	2.5177
Railroad Equipment	0.2458	0.5224	2.1253	3.2161
Motorcycles, Bicycles, and Parts	0.1831	0.4161	2.2724	3.6569
Travel Trailers and Campers	0.1963	0.4407	2.2446	3.6517
Mobile Homes	0.1895	0.4450	2.3484	3.8551
Transportation Equipment, n.e.c.	0.2026	0.5115	2.5250	3.9711
Engineering and Scientific Instruments	0.3522	0.6442	1.8293	2.1878
Mechanical Measuring Devices	0.3907	0.6755	1.7288	2.0549
Environmental Controls	0.3798	0.6525	1.7182	2.0427
Surgical and Medical Instruments	0.3202	0.5685	1.7753	2.1223
Surgical Appliances and Supplies	0.2872	0.5286	1.8408	2.2311

TABLE 4 (continued)

Input-Output Sector	Direct Earnings Coefficient	Total Earnings Coefficient	Type II Income Multiplier	Type II Employment Multiplier
Dental Equipment and Supplies	0.2963	0.5733	1.9346	2.3212
Watches, Clocks, and Parts	0.2447	0.4711	1.9249	2.3166
Optical Instruments and Lenses	0.3391	0.6166	1.8183	2.2049
Ophthalmic Goods	0.3592	0.6181	1.7205	2.0709
Photographic Equipment and Supplies	0.2494	0.4790	1.9204	2.3102
Jewelry, Precious Metal	0.2261	0.4743	2.0980	1.9359
Silverware and Plated Ware	0.3232	0.5654	1.7496	1.6347
Costume Jewelry	0.3163	0.5660	1.7896	1.6898
Musical Instruments	0.3301	0.6439	1.9507	1.8099
Games, Toys, and Children's Vehicles	0.2363	0.4822	2.0408	1.9042
Dolls	0.2204	0.4304	1.9532	1.8400
Sporting and Athletic Goods, n.e.c.	0.2537	0.5206	2.0517	1.9056
Pens and Mechanical Pencils	0.2407	0.4905	2.0375	1.8994
Marking Devices	0.3615	0.7125	1.9708	1.8267
Artificial Trees and Flowers	0.2473	0.5097	2.0610	1.9494
Needles, Pins, and Fasteners	0.2932	0.4982	1.6992	1.6157
Brooms and Brushes	0.2964	0.5547	1.8712	1.7653
Burial Caskets and Vaults	0.2854	0.5895	2.0658	1.8804
Signs and Advertising Displays	0.3529	0.6177	1.7505	1.6616
TRANSPORTATION, COMMUNICATIONS, AND UTILITIES				
Railroads and Related Services	0.4516	0.8647	1.9148	2.4477
Local, Suburban, and Interurban Highway Transit	0.4895	0.7790	1.5914	2.0385
Motor Freight Transportation and Warehousing	0.4608	0.8118	1.7616	2.2495
Water Transportation	0.2002	0.3648	1.8221	2.4135
Air Transportation	0.3213	0.5735	1.7849	2.3503
Pipe Lines, Except Natural Gas	0.1420	0.3302	2.3246	3.0653
Freight Forwarders and Other Transportation Services	0.4565	0.7972	1.7465	2.3287
Arrangement of Passenger Transportation	0.5840	0.9024	1.5452	2.0104
Communications, Except Radio and TV	0.2665	0.4499	1.6882	2.4053
Radio and TV Broadcasting	0.2486	0.5333	2.1452	3.9053
Electric Utilities	0.1061	0.3542	3.3388	5.4601
Gas Production and Distribution Utilities	0.0741	0.2298	3.0994	4.9804
Water Supply and Sewerage Systems	0.1151	0.4581	3.9793	7.1397
Sanitary Services, Steam Supply, and Irrigation	0.2058	0.4510	2.1911	3.5837
WHOLESALE AND RETAIL TRADE				
Wholesale Trade	0.3912	0.6698	1.7122	2.1738
Retail Trade	0.4968	0.7779	1.5659	1.4719
FINANCE, INSURANCE, AND REAL ESTATE				
Banking	0.3522	0.6364	1.8072	2.1334
Credit Agencies Other Than Banks	0.1018	0.3767	3.7019	4.7541
Security and Commodity Brokers	0.5285	0.9000	1.7029	1.9947
Insurance Carriers	0.3299	0.6600	2.0008	2.2532
Insurance Agents, Brokers, and Services	0.7009	1.0327	1.4734	1.6448
Real Estate	0.0644	0.1779	2.7613	1.5917

TABLE 4 (continued)

Input-Output Sector	Direct Earnings Coefficient	Total Earnings Coefficient	Type II Income Multiplier	Type II Employment Multiplier
SERVICES				
Hotels and Lodging Places	0.3569	0.6433	1.8027	1.4761
Laundry, Cleaning and Shoe Repair	0.4706	0.7722	1.6409	1.3908
Funeral Service and Crematories	0.3260	0.6795	2.0843	1.6023
Photographic Studios and Misc. Personal Services	0.4714	0.7369	1.5631	1.3322
Electrical Repair Shops	0.3716	0.6187	1.6651	1.3607
Watch, Clock, Jewelry, and Furniture Repair	0.4102	0.6285	1.5321	1.3061
Beauty and Barber Shops	0.5967	0.8557	1.4339	1.2686
Miscellaneous Repair Shops	0.3485	0.5496	1.5772	1.5663
Services to Dwellings and Other Buildings	0.5470	0.8016	1.4655	1.4836
Personnel Supply Services	0.6655	0.9734	1.4626	1.4983
Computer and Data Processing Services	0.4672	0.7426	1.5896	1.6041
Management, Consulting, and Research Services	0.4737	0.7810	1.6489	1.6740
Detective and Protective Services	0.6020	0.9216	1.5308	1.5748
Equipment Rental and Leasing Services	0.3218	0.5170	1.6066	1.6489
Photo Labs, Photocopy, and Commercial Photography	0.3580	0.5862	1.6376	1.6535
Other Business Services	0.4190	0.7173	1.7118	1.6768
Advertising	0.4260	0.6644	1.5597	1.6011
Legal Services	0.7243	1.0690	1.4758	1.5107
Engineering and Architectural Services	0.5482	0.9272	1.6912	1.7273
Accounting, Bookkeeping, and Miscellaneous Services	0.5819	0.9066	1.5581	1.6056
Eating and Drinking Places	0.3124	0.6019	1.9264	1.4179
Automotive Rental and Leasing, Without Drivers	0.2358	0.4500	1.9082	1.8855
Automotive Repair Shops and Services	0.3073	0.5660	1.8416	1.8245
Automobile Parking and Car Washes	0.2709	0.4863	1.7954	1.8283
Motion Pictures	0.2537	0.6179	2.4352	2.0241
Theatrical Producers, Bands, and Entertainers	0.3343	0.6863	2.0527	1.6640
Bowling Alleys, Billiard and Pool Halls	0.2888	0.6263	2.1684	1.7054
Commercial Sports, Except Racing	0.4620	0.8523	1.8446	1.5908
Racing (Including Track Operations)	0.2025	0.3481	1.7192	1.4205
Membership Sports and Recreation Clubs	0.2697	0.6424	2.3821	1.8009
Other Amusement and Recreation Services	0.3504	0.6197	1.7688	1.4649
Doctors and Dentists	0.6411	0.9808	1.5300	1.7222
Hospitals	0.5183	0.8348	1.6106	1.8262
Nursing and Personal Care Facilities	0.5889	0.9006	1.5292	1.7400
Other Medical and Health Services	0.5642	0.8620	1.5279	1.7103
Elementary and Secondary Schools	0.4142	0.7671	1.8522	1.8798
Colleges, Universities, and Professional Schools	0.5518	0.8974	1.6263	1.6667
Libraries, Vocational Schools, and Ed. Services, n.e.c.	0.5220	0.8683	1.6635	1.6958
Business and Professional Membership Organizations	0.3905	0.7983	2.0443	2.0560
Labor, Civic, Social, and Fraternal Organizations	0.4166	0.8125	1.9502	2.0102
Religious Organizations	0.5740	0.9287	1.6181	1.6487
Other Membership Organizations	0.4612	0.8546	1.8529	1.8712
Job Training and Related Services	0.5884	0.9252	1.5725	1.5969
Child Day Care Services	0.5620	0.8111	1.4431	1.4787
Residential Care	0.4619	0.8246	1.7851	1.8376
Social Services, n.e.c.	0.4943	0.9055	1.8319	1.8430

TABLE 4 (continued)

Input-Output Sector	Direct Earnings Coefficient	Total Earnings Coefficient	Type II Income Multiplier	Type II Employment Multiplier
GOVERNMENT ENTERPRISES				
U.S. Postal Service	0.7258	1.1095	1.5286	1.9115
Other Federal Government Enterprises	0.2703	0.5288	1.9566	2.0022
Local Government Passenger Transit	0.3051	0.5942	1.9476	2.5581
State and Local Electric Utilities	0.1410	0.4137	2.9343	4.7471

Source: Calculated by BEBR from the coefficients of a RIMS II 531-sector model of the Utah economy developed by the U.S. Department of Commerce, Bureau of of Economic Analysis.

(continued from page 7)
Modeling System (RIMS II): Estimation, Evaluation, and Application of a Disaggregated Regional Impact Model (U.S. Department of Commerce, Bureau of Economic Analysis, 1981). Definitions of the BEA input-output industrial sectors in terms of their component Standard Industrial Classification codes may be found in Appendix B of "Input-Output Structure of the U.S. Economy, 1977," *Survey of Current Business*, Vol. 64, No. 5 (May 1984), pp. 80-84.

5. The use of margins in calculating the impact of changes in trade sector gross sales is discussed in *Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System (RIMS II)* on pp. 16-19.

6. See Boyd L. Fjeldsted and Frank C. Hachman, "Results of the 1989-90 Utah Ski Industry Study," *Utah Economic and Business Review*, Vol. 50, No. 7 (July 1990). Trade and transportation margin percentages may be estimated from a table issued by the Interindustry Economics Division of the Bureau of Economic Analysis entitled "Table B.--Detailed Input-Output Commodity Composition of Personal Consumption Expenditures, 1977." This table is an expanded version of "Table B.--Input-Output Commodity Composition of Personal Consumption Expenditures, in Producers' and Purchasers' Prices, 1977" that appeared on pages 46-48 of "Input-Output Structure of the U.S. Economy, 1977," *Survey of Current Business*, Vol. 64, No. 5 (May 1984).

CORRECTION

The UEBR, Vol. 50, No. 7, July 1990, contained an error in Table 1 and should be corrected to read as follows:

Expenditure Category	Total Jobs Coefficient	Total Jobs Generated
Total Wholesale Requirement	3.04E-05	161
Totals		11,649

Utah Business Statistics

UTAH DATA	Jul. 1989	Jul. 1990	% Change from Year Ago	12-Month Average This Year	12-Month Average Last Year	12-Month Average % Change
Total Personal Income (seasonally adjusted) (mil. of dol.) (qtly.)	22,328	NA	NA	NA	21,513	NA
New Corporations (no.)	416	171a	-58.9%	473	452	4.8%
New Car, Truck, and Motor Home Sales (no.)	5,494	NA	NA	NA	5,095	NA
Agriculture						
Average Prices Recorded by Farmers (dol.)						
Beef Steers and Heifers (cwt) (thous.)	72.50	74.50	2.8%	74.73	71.02	5.2%
Lambs (cwt)	63.00	48.80	-22.5%	53.90	61.63	-12.5%
Milk Wholesale (cwt)	11.60	13.20	13.8%	13.49	11.97	12.7%
Alfalfa Hay, Baled (per ton)	87.00	86.00	-1.1%	85.42	81.42	4.9%
Cattle Slaughtered (live weight) (thous. of lbs.)	46,874	48,187	2.8%	47,765	47,451	0.7%
Construction						
Total Construction (thous. of dol.) 1	74,631.3	134,941.3	80.8%	86,564.6	68,545.5	26.3%
Residential	44,545.6	52,792.4	18.5%	41,995.3	33,972.6	23.6%
Nonresidential	15,850.0	71,562.0	351.5%	28,701.7	21,833.5	31.5%
Additions, Alterations, and Conversions	14,235.7	10,586.9	-25.6%	15,867.6	12,739.3	24.6%
Total Permit Construction (thous. of dol.) 2	84,658.4	149,842.0	77.0%	94,708.8	75,272.2	25.8%
Residential	44,826.9	56,796.5	26.7%	44,499.9	35,248.7	26.2%
Nonresidential	24,108.6	81,969.8	240.0%	35,509.8	26,258.9	35.2%
Additions, Alterations, and Repairs	15,722.9	11,075.7	-29.6%	14,699.0	13,764.6	6.8%
New Dwelling Units (no.)	553	623	12.7%	541	458	18.1%
Employment						
Civilian Labor Force (thous.)	797.9	799.2	0.2%	796.3	776.1	2.6%
Total Employed Persons	762.3	763.8	0.2%	761.8	739.4	3.0%
Unemployed Persons	35.6	35.4	-0.6%	34.4	36.4	-5.3%
Percent Total Labor Force	4.5	4.4	-2.2%	4.3	4.7	-8.8%
Employees on Nonagricultural Payrolls (thous. of jobs)	685.3	719.2	4.9%	709.7	677.8	4.7%
Manufacturing	103.5	106.6	3.0%	104.5	101.8	2.7%
Mining	8.2	8.7	6.1%	8.5	7.9	8.0%
Contract Construction	28.1	29.0	3.2%	26.8	25.6	4.5%
Transportation, Communication, and Utilities	40.9	43.2	5.6%	42.3	40.4	4.6%
Wholesale Trade	39.2	40.8	4.1%	39.6	37.4	5.8%
Retail Trade	127.4	136.3	7.0%	132.7	124.7	6.4%
Finance, Insurance, and Real Estate	33.5	34.4	2.7%	33.7	33.2	1.3%
Services 3	166.9	178.9	7.2%	173.7	162.3	7.0%
Federal Government	40.5	40.2	-0.7%	40.3	39.8	1.3%
State Government 4	38.4	40.3	4.9%	41.3	39.4	4.9%
Local Government 4	58.8	60.8	3.4%	66.5	65.5	1.6%
Average Weekly Hours						
Manufacturing	39.5	39.7	0.5%	40.0	40.2	-0.6%
Mining	41.6	45.0	8.2%	42.2	40.5	4.2%
Wholesale Trade	38.9	38.8	-0.3%	36.5	37.5	-2.7%
Retail Trade	28.0	28.0	0.0%	26.9	27.4	-1.6%
Amount of Unemployment Compensation (thous. of dol.)	3,745.0	4,139.7	10.5%	4,960.3	5,272.8	-5.9%
Finance						
Savings, Savings and Loan Association (mil. of dol.)	2,189.2	1,795.5	-18.0%	1,981.4	2,288.6	-13.4%
Tax Collections by the State of Utah (thous. of dol.)						
Total Tax Collections	219,161.2	NA	NA	NA	162,061.3	NA
Sales and Use Tax	100,450.6	NA	NA	NA	63,241.8	NA
Motor Fuel Tax	12,027.7	NA	NA	NA	11,789.3	NA
Individual Income Tax	59,300.3	NA	NA	NA	54,113.9	NA
Corporation Franchise Tax	5,898.3	NA	NA	NA	7,597.7	NA
Production						
Crude Oil to Refineries (thous. of bbls.)	3,748.1	3,850.0	2.7%	3,565.9	4,302.8	-17.1%
Crude Oil (thous. of bbls.)	2,420.3	2,283.9	-5.6%	2,334.0	2,476.6	-5.8%
Natural Gas (mil. of cu. ft.)	23,794.9	27,405.8	15.2%	25,065.3	22,684.6	10.5%
Coal (thous. short tons)	1,370.0	1,610.0	17.5%	1,867.3	1,565.0	19.3%
Tourism/Travel						
Air Passengers (total no. on and off)(S.L. Int'l Airport)	1,143,496	1,158,206	1.3%	1,006,999	931,064	8.2%
Highway Traffic Count Across State Lines	41,318	NA	NA	NA	NA	NA
Transient Room Taxes (thous. of dol.)	775.2	NA	NA	NA	633.6	NA
Visits, State, Nat'l. Parks, Monuments (thous.)	2,267.4	2,224.3	-1.9%	1,133.6	1,101.4	2.9%
Utilities						
Telephone Lines in Service (Mt. Bell)(Residential)	498,401	515,052	3.3%	509,294	494,963	2.9%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	186,762	195,593	4.7%	190,285	184,307	3.2%
Electric Customers (Residential)	481,930	489,470	1.6%	487,726	481,175	1.4%
Electric Customers (Commercial)	47,743	48,436	1.5%	49,187	47,527	3.5%
Natural Gas Customers (Residential & Commercial)	470,838	484,994	3.0%	481,253	466,681	3.1%
Natural Gas Customers (Industrial)	567	578	1.9%	569	560	1.5%

Utah Business Statistics

UTAH DATA	Jul. 1989	Jul. 1990	% Change from Year Ago	12-Month Average This Year	12-Month Average Last Year	12-Month Average % Change
Davis County						
Non-Ag. Employment (thous.)	58.1r	60.8f	4.6%	57.6	55.3	4.2%
Unemployment Rate	4.2r	4.5	7.1%	4.1	4.3	-4.3%
Auth. Permit Construction (thous. of dol.)	10,112.1	18,400.9	82.0%	10,662.0	9,262.3	15.1%
New Dwelling Units (no.)	87	85	-2.3%	76	66	16.0%
Postal Receipts (thous. of dol.)	639.7	685.6	7.2%	646.5	536.9	20.4%
Electric Customers (Residential)	49,039	49,909	1.8%	49,668	48,582	2.2%
Electric Customers (Commercial)	3,610	3,624	0.4%	3,666	3,568	2.8%
Natural Gas Customers (Residential)	51,808	52,904	2.1%	52,477	51,261	2.4%
Natural Gas Customers (Industrial)	56	57	1.8%	56	55	2.6%
Telephone Lines in Service (Mt. Bell)(Residential)	57,016	60,476	6.1%	58,915	56,231	4.8%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	12,069	12,881	6.7%	12,483	11,719	6.5%
Salt Lake County						
Non-Ag. Employment (thous.)	350.7r	365.5f	4.2%	362.7	347.1	4.5%
Unemployment Rate	4.0r	3.9	-2.5%	3.9	4.3	-10.1%
Auth. Permit Construction (thous. of dol.)	33,440.0	78,095.7	133.5%	41,733.9	31,995.5	30.4%
New Dwelling Units (no.)	167	202	21.0%	190	170	11.6%
Postal Receipts (thous. of dol.)	7,372.8	7,265.1	-1.5%	8,057.6	8,273.3	-2.6%
Electric Customers (Residential)	241,864	245,823	1.6%	245,130	241,819	1.4%
Electric Customers (Commercial)	20,671	21,047	1.8%	21,108	20,701	2.0%
Natural Gas Customers (Residential)	223,645	228,032	2.0%	226,914	222,932	1.8%
Natural Gas Customers (Industrial)	244	246	0.8%	245	240	2.0%
Telephone Lines in Service (Mt. Bell)(Residential)	235,534	242,939	3.6%	239,742	232,849	3.0%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	113,237	118,518	4.7%	115,657	112,079	3.2%
Utah County						
Non-Ag. Employment (thous.)	84.2r	91.2f	8.3%	89.9	84.7	6.1%
Unemployment Rate	4.6r	3.9	-15.2%	3.8	4.1	-7.3%
Auth. Permit Construction (thous. of dol.)	12,905.9	18,063.0	40.0%	13,851.6	12,100.8	14.5%
New Dwelling Units (no.)	82	130	58.5%	92	71	30.3%
Postal Receipts (thous. of dol.)	1,298.1	1,579.5	21.7%	1,654.1	1,332.7	24.1%
Electric Customers (Residential)	52,967	53,114	0.3%	53,268	52,934	0.6%
Electric Customers (Commercial)	6,072	6,100	0.5%	6,778	5,995	13.1%
Natural Gas Customers (Residential)	62,638	64,278	2.6%	63,896	62,551	2.1%
Natural Gas Customers (Industrial)	73	74	1.4%	73	72	2.0%
Telephone Lines in Service (Mt. Bell)(Residential)	65,455	66,334	1.3%	66,517	65,727	1.2%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	21,278	21,056	-1.0%	20,360	21,049	-3.3%
Weber County						
Non-Ag. Employment (thous.)	62.8r	66.1f	5.3%	66.0	63.4	4.1%
Unemployment Rate	5.3r	5.8	9.4%	5.2	5.6	-7.3%
Auth. Permit Construction (thous. of dol.)	4,744.7	6,941.4	46.3%	6,810.8	5,149.7	32.3%
New Dwelling Units (no.)	48	45	-6.3%	45	44	1.9%
Postal Receipts (thous. of dol.)	549.7	596.8	8.6%	710.3	679.0	4.6%
Electric Customers (Residential)	53,949	54,760	1.5%	54,565	53,951	1.1%
Electric Customers (Commercial)	4,948	5,112	3.3%	5,071	4,981	1.8%
Natural Gas Customers (Residential)	50,285	51,321	2.1%	51,019	50,279	1.5%
Natural Gas Customers (Industrial)	85	83	-2.4%	84	84	-0.7%
Telephone Lines in Service (Mt. Bell)(Residential)	47,424	46,993	-0.9%	47,155	47,014	0.3%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	12,212	13,210	8.2%	12,809	12,149	5.4%

1 Obtained from U.S. Bureau of the Census Construction Statistics Division.
2 Obtained from *Utah Construction Report*.
3 Includes services by nonprofit and religious organizations.
4 Includes public schools and college institutions.

NA Not Available
a Number is small due to a computer failure in government offices. August number will therefore be much higher than normal.
r Revised
f Forecast

Sources:

Personal Income	U.S. Department of Commerce, Bureau of Economic Analysis.
New Corporations	Utah Secretary of State.
New Car and Truck Sales	Utah State Tax Commission, Economic and Statistical Unit.
Agriculture	U.S. Department of Agriculture, Utah Agricultural Statistics Service, *Utah Agriculture*.
Construction Data	U.S. Bureau of the Census and Bureau of Economic and Business Research, *Utah Construction Report*.
Employment Data	Utah Department of Employment Security.
Savings Information	Utah Savings and Loan Institutions.
Tax Collections	Utah State Tax Commission.
Crude Oil Production	Utah Department of Oil, Gas, and Mining and Area Oil Refineries.
Natural Gas Production	Utah Department of Oil, Gas, and Mining.
Coal Production	U.S. Department of Energy.
Air Passengers	Salt Lake City International Airport, Statistics Division.
Highway Traffic Count	Utah Department of Transportation.
Visits to State and National Parks and Monuments	U.S. Forest Service, Utah State Parks and Recreation Department.
Utilities Data	Cooperating Utah Utility Companies.
Postal Receipts	Postmasters in Davis, Salt Lake, Utah, and Weber Counties.

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NATIONAL DATA	Jul. 1989	Jul. 1990	% Change from Year Ago	12-Month Average This Year	12-Month Average Last Year	12-Month Average % Change
U.S. Gross National Product (seasonally adjusted) (bil.) (qtly.)	5,238.6	NA	NA	NA	5,077.5	NA
Total Personal Income (seasonally adjusted) (bil. of dol.)	4,398.2	4,672.4	6.2%	4,538.1	4,266.0	6.4%
Industrial Production Indexes (seasonally adjusted) (1987=100)	107.8	109.9	1.9%	108.6	107.5	1.1%
New Plant and Equipment Expenditures by Business (bil.) (qtly.)	484.9	NA	NA	NA	456.1	NA
Net Exports of Goods and Services (bil.) (qtly.)	-49.3	NA	NA	NA	-58.2	NA
Exports of Goods and Services (bil.) (qtly.)	623.7	NA	NA	NA	600.5	NA
Imports of Goods and Services (bil.) (qtly.)	673.0	NA	NA	NA	658.7	NA
Index of Leading Indicators (1982=100)	144.1	146.1	1.4%	145.2	144.6	0.4%
Price Indexes						
Consumer Price Indexes (not seasonally adjusted) (1982-84=100)						
CPI-U (All Urban Consumers) All Items	124.4	130.4	4.8%	127.5	121.7	4.8%
CPI-U (All Urban Consumers) Food & Beverages	125.4	132.4	5.6%	129.2	122.3	5.6%
CPI-U (All Urban Consumers) Housing	123.9	129.2	4.3%	126.0	121.0	4.1%
CPI-U (All Urban Consumers) Transportation	115.4	118.4	2.6%	116.3	112.3	3.6%
CPI-U (All Urban Consumers) Medical Care	149.7	163.5	9.2%	156.8	144.4	8.6%
CPI-U (All Urban Consumers) Energy	98.5	99.8	1.3%	96.2	92.5	4.1%
Producer Price Index (not seasonally adjusted) (1982=100)						
Producer Price Index, All Finished Goods	114.0	118.0	3.5%	116.2	111.4	4.3%
GNP Price Deflator (1982=100) (qtly.)	126.8	NA	NA	NA	124.4	NA
Civilian Employment (seasonally adjusted)						
Total Civilian Labor Force (mil.)	124.0	124.8	0.6%	124.5	123.0	1.2%
Total Civilian Employment (mil.)	117.4	118.0	0.5%	118.0	116.5	1.3%
Unemployment Rate	5.3	5.5	3.8%	5.3	5.3	0.2%
Construction						
Total Construction (mil. of dol.)	23,363.8	20,893.3	-10.6%	20,487.0	21,936.1	-6.6%
Residential	10,535.4	9,745.1	-7.5%	9,503.9	10,269.0	-7.5%
Nonresidential	8,725.2	7,323.4	-16.1%	7,178.6	7,731.2	-7.1%
Non-Building	4,103.2	3,824.8	-6.8%	3,804.5	3,935.9	-3.3%
New Dwelling Units (no.)	122,631	101,310	-17.4%	103,438	119,329	-13.3%
Interest Rates						
Federal Funds Rate	9.24	8.15	-11.8%	8.46	9.03	-6.3%
Short Term (3-month Treasury bill rate)	7.92	7.66	-3.3%	7.73	8.02	-3.6%
Long Term (30-year Treasury bond yields)	8.19	8.64	5.5%	8.47	8.98	-5.7%
Prime Rates Charged by Banks on Short-term Business Loans (avg.)	10.98	10.00	-8.9%	10.22	10.70	-4.5%
Mortgage Rates (new homes)	10.06	9.75	-3.1%	9.75	9.38	4.0%

Sources: *Survey of Current Business*, U.S. Department of Commerce: U.S. Gross National Product, Total Personal Income, Industrial Production Indexes, New Plant and Equipment Expenditures by Business, Export/Import Data, Index of Leading Indicators, GNP Price Deflator, National Employment Data, Interest Rates.

F.W. Dodge Report, McGraw-Hill: National Construction Data.

U.S. Department of Labor, Bureau of Labor Statistics: Consumer Price Indexes, Producer Price Index.

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